1. In a medical or orthodontic component or device having at least a portion thereof fabricated from Ni-Ti based shape memory alloy, the improvement comprising:

(a) said alloy being more than 50 atomic % nickel;

(b) said alloy having been solution treated at a temperature of 650 to 1100° C. for 10-60 minutes;

(c) after cooling, said alloy having been aged by heating it at a temperature of approximately 350° C. for 10-60 minutes;

(d) said portion being characterized by:

(i) having pseudoelastic properties without cold working,

(ii) having greater than 2.5% elasticity over a temperature range of -20° C. to +40° C., and

(iii) allowing large plastic deformations during the fabrication of said portion.

2. A component or device as defined in claim 1, characterized by being capable of large amounts of cold forming without danger of cracking or fracture during forming operations in its solution treated condition which are required to make orthodontic and medical components.

3. A component or device as defined in claim 2 wherein said portion is an orthodontic component.

4. A component or device as defined in claim 2 wherein said portion is a stent.

5. A component or device as defined in claim 2 wherein said portion is at least one selected from the group consisting of: a catheter introducer; oral maxillofacial reconstructive procedures using pins and/or plates; an oviduct clamp; a bone staple; a graft prosthesis; a stent for biliary, urinary or vascular system; an infusion catheter; and a urological stent.

6. A component or device as defined in claim 2, wherein said alloy composition is about 56.1wt% NI-43.9%Ti, which is solution treated at a temperature of 850° C. and subsequently water quenched and which can be readily cold formed in this condition, and which is subsequently aged at 350° C. generates pseudoelastic behavior in the component which is observed over the temperature range of -20° to +40° C.

7. A component or device as defined in claim 6, wherein said portion has been solution treated for about 30 minutes, and has been aged for about 30 minutes.

8. A component or device as defined in claim 7 wherein said portion has been cold worked about 20% before the solution treatment whereby the temperature range of the pseudoelastic performance is extended.

9. A component or device as defined in claim 7, wherein the relatively small amounts of cold work before the ageing treatment do not exceed 30%.

10. A component or device as defined in claim 2 wherein said portion is further characterized by a pseudoelastic or superelastic behaviour over the temperature range from -20°C to +40°C.

~~11.~~ 10 A component or device as defined in claim 1, wherein said alloy portion has additional alloying elements, which, without substantially altering the processing of the portion, extend the temperature range of the pseudoelastic behaviour of the portion, and wherein said additional alloying elements are at least one selected from the group consisting of Ta, Mo, Nb, Co, Cr, Cu, V, Mn and Fe.

~~12.~~ 11 A component or device as defined in claim 10 wherein the shape memory portion exhibits pseudoelastic properties with an upper plateau stress which is between approximately 42Ksi and 72Ksi, whereby the stress level is well suited for orthodontic and medical components.

~~13.~~ 12 A component or device as defined in claim 10 wherein there has been cold work of about 10-15% either before or after aging treatment and this has little effect on the pseudoelastic properties except for a slight improvement in this property.

~~14.~~ 13 A component or device as defined in claim 10 wherein the aging treatment has provided stress relief after secondary operations such as coating, plating or joining while at the same time imparting the desired pseudoelastic properties.

15. 14 A component or device as defined in claim 10 characterized by the portion having been subjected to various cold work levels during fabrication to create various cross section of the design and after aging treatment exhibiting substantially uniform pseudoelastic properties.

16. 15 A component or device as defined in claim 10 which exhibits pseudoelasticity at ambient and/or body temperature.

17. 16 A component or device as defined in claim 10 wherein said portion is one selected from the group consisting of orthodontic arch wire, springs, implants, endodontic files.

18. 17 A component or device as defined in claim 10 wherein said portion is characterized by having super-elastic properties by having been solution treated and aged, and exhibiting complete elastic behavior at strains up to 4%, thereby permitting the designing of medical instruments and devices which are resistant to permanent deformation or kinking.

19. A method of making at least a component of a medical or orthodontal instrument or device, comprising:

(a) fabricating said component of an alloy which includes

(i) an alloy of NiTi with a higher nickel content than an equiatomic Ni/Ti ratio in a Ni-Ti shape memory alloy,

(ii) and which has been solution treated at a temperature of 650 to 1100° C. for 10-60 minutes; and

(b) aging said component after it is fabricated, by heating it at a temperature of approximately 350° C. for 10-60 minutes,

said portion being characterized by:

having pseudoelastic properties without could working,

having greater than 2.5% elasticity over a temperature range of -20° C. to +40° C., and

allowing large plastic deformations during the fabrication step before the desired pseudoelastic properties are established.

20. A method as defined in claim 19, wherein said step of fabricating includes large plastic deformations of said alloy before pseudoelasticity is imparted to the component.

21. A method as defined in claim 20, wherein said NiTi based shape memory component is characterised by having pseudoelastic properties without using cold working and greater than 2.5% elasticity over the temperature range of -20 to +40° C.

22. A method as defined in claim 19, wherein said component is formed into an orthodontic arch wire.

24. A method as defined in claim 19, wherein said component is formed into an a medical device for use within a living body.

25. A method as defined in claim 19, wherein said component is formed into a medical device chosed from the group consisting of: (1) a stent; (2) a catheter introducer; (3) oral poins and/or plates used in maxillofacial reconstructive procedures; (4) an oviduct clamp; and (5) bone staples.